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Potentially Avoidable Hospitalizations in Tennessee, 2004 and 2005

Cyril F. Chang, Ph.D.

In health care and elsewhere, it is difficult to improve what cannot be measured. To measure the adequacy and quality of ambulatory care, researchers have recently focused on hospitalizations that can potentially be avoided.[1,2,3] These are inpatient admissions for certain conditions, called Ambulatory Care Sensitive Conditions (ACSCs), that can be prevented when clinicians deliver timely and effective outpatient treatment to individuals who actively participate in their own care, follow a healthy life style, and engage in responsible personal behavior.[4] Nationally, nearly five million inpatient admissions to U.S. hospitals in 2000 involved treatment for one or more of these ACSCs, resulting in a total cost of more than $26.5 billion.[5] High rates of hospitalizations for these conditions thus suggest resources wasted as well as opportunities for improving health system efficiency by delivering timely and effective primary care in the ambulatory setting.

This report is an analysis of Tennessee hospitalization records for potentially avoidable admissions (or hospitalizations for ACSCs) for 2004 and 2005. It is an update of a previous report by the Methodist Le Bonheur Center for Healthcare Economics based on hospital discharge data for 2003.[6] A major improvement in this updated report is the use of the revised definitions of ACSCs released in 2007 by the Agency for Healthcare Research and Quality (AHRQ).[7] This updated version of ACSC definitions as described in the AHRQ's new Prevention Quality Indicators (PQIs) has moved two pediatric conditions, pediatric asthma and pediatric gastroenteritis, to a new and separate set of quality indicators for the pediatric population. The resulting 14 PQIs for adult populations now include:

PQI No.	Prevention Quality Indicators
1.	Diabetes short-term complications
2.	Perforated appendix
3.	Diabetes long-term complications
5.	Chronic obstructive pulmonary disease
7.	Hypertension
8.	Congestive heart failure
9.	Low birth weight
10.	Dehydration
11.	Bacterial pneumonia
12.	Urinary track infection
13.	Angina admission without procedure
14.	Uncontrolled diabetes
15.	Adult asthma
16.	Low-extremity amputation among patients with diabetes

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Method: Tennessee law (Tennessee Code Annotated (TCA), Section 68-1-108) requires that every licensed hospital report all claims data found on the UB-92 Form to the Tennessee Department of Health. The Division of Health Statistics in the Office of Policy Planning and Assessment of the Department of Health has established the Hospital Discharge Data System (HDDS) to collect, compile, and disseminate patient-level discharge information since 1997.[8] The data presented in this report contain excerpts from the 2005 HDDS dataset that covers the data period from January 1, 2005, through December 31, 2005. The study population is restricted to newborns (live births and low-birth-weight births) and adult patients (ages 18 and over) discharged from non-federal short-stay hospitals, including general medical and surgical hospitals, women's or OB/GYN hospitals, and pediatric hospitals. Excluded are patients discharged from long-term, psychiatric, rehabilitation, and other specialty hospitals. Also excluded, following the guidelines for using the AHRQ Quality Indicators, are patients who were transferred from another institution and patients discharged against medical advice.

A critical first step in the analysis of the prevalence of potentially avoidable hospitalizations involves the identification of diseases or conditions for which timely and effective primary care can prevent the need for hospitalization. Lists of preventable admissions have been determined and reported by panels of experts.[1-3] In the early 1990s, the Agency for Healthcare Quality (AHRQ) asked researchers from the Evidence-Based Practice Center at the University of California San Francisco and Stanford University to review the literature and use validation tests to determine a narrow set of inpatient admissions with ACSC conditions. The results of a decade-long work were reported in a 2004 AHRQ publication under the Prevention Quality Indicators Project.[4]

For this report, we used the revised ACSC definitions as reported in the March 2007 revision of the AHRQ Publication, *AHRQ Quality Indicators – Guide to Prevention Quality Indicators: Hospital Admissions for Ambulatory Sensitive Conditions* Version 3.1. This publication, together with its sister publication, *AHRQ Quality Indicators - Prevention Quality Indicators: Technical Specifications* Version 3.1, provides a comprehensive review of the origins, background, and technical specifications of the AHRQ Prevention Quality Indicators Project.

Results: In 2005, a total of 139,765 ACSC hospitalizations occurred in Tennessee (Table 1), representing about 14.3% of all inpatient discharges at acute-care hospitals across the State. This is a decrease from 15.5% in 2004. The leading ACSC was bacterial pneumonia accounting for 34,850 or 24.9% of the state total of potentially avoidable hospitalizations in 2005. This was followed by congestive heart failure (32,129 or 23% of total) and chronic obstructive pulmonary disease (16,567 or 11.9% of total). Compared to the United States, Tennesseans experienced a higher rate of potentially avoidable hospitalizations in 8 of the 14 ACSCs in 2004. This was increased to 10 of the 14 ACSCs when comparing Tennessee's 2005 potentially avoidable hospitalizations to the same 2004 U.S. data. The most notable of these is bacterial pneumonia, where Tennessee exceeded the U.S. by a large margin. In contrast, the U.S. had higher rates for diabetes with long-term complications, hypertension, angina without procedure, and lower-extremity amputation among patients with diabetes.

Compared to the 2004 data, the 2005 data in Table 1 shows a slight decline in three of the ACSCs. These include chronic obstructive pulmonary disease (288.3 vs. 292.6 per 100,000 adult population), hypertension (49 vs. 51.2 per 100,000 adult population), and

angina without procedure (25.1 vs. 30.6 per 100,000 adult population). The rates of lower-extremity amputation among patients with diabetes, uncontrolled diabetes, and low birth weight birth remained virtually unchanged between 2004 and 2005. The remaining 8 ACSCs showed increase from 2004 to 2005.

Table 1. Potentially Avoidable Hospitalizations, 2004 & 2005 comparison

PQI No.	ACS Condition	No. of Discharges		%	Rate Per 100,000 Population		
		2004	2005	Change	TN 2004	TN 2005	US 2004
1	Diabetes Short-term Complications	3,446	4,272	24%	59.9	74.3	54.7
2	Perforated Appendix	1,158	1,643	42%	24.9	35.3	30.2
3	Diabetes Long-term Complications	6,407	7,178	12%	111.5	124.9	126.8
5	Chronic Obstructve Pulmonary Disease	16,817	16,567	-1%	292.6	288.3	230.4
7	Hypertension	2,946	2,818	-4%	51.2	49.0	49.7
8	Congestive Heart Failure	28,513	32,129	13%	496	558.9	488.6
9	Low Birth Weight Birth	6,250	6,667	7%	7.8	8.3	6.3
10	Dehydration	7,679	9,148	19%	133.6	159.2	127.4
11	Bacterial Pneumonia	27,355	34,850	27%	475.9	606.3	418.2
12	Urinary Tract Infection	11,149	12,357	11%	194	215.0	177.3
13	Angina without Procedure	1,757	1,439	-18%	30.6	25.1	45.9
14	Uncontrolled Diabetes	1,401	1,505	7%	24.4	26.2	22.2
15	Adult Asthma	5,786	9,189	59%	100.7	159.9	120.6
16	Lower-extremity Amputation among Patients with Diabetes	5	3	40%	0.1	0.1	39.1
	Total	120,669	139,765	16%	1970.5	2282.3	1878.5

[1.] Perforated Appendix rate calculated for each 100 at risk population defined as total appendicitis hospitalizations (4,658 in Tennessee, 2
[2.] Low Birth Weight Birth rate calculated for 100 live births (80,083 in Tennessee, 2004)
[3.] Total ACSC admissions include 114,419 adult cases and 6,250 low birth weight births
[4.] The U.S. rates were for 2004 and downloaded from http://www.qualityindicators.ahrq.gov/downloads/pqi/pqi_compatative_v31.pdf
[5.] Rate per 100,000 for U.S. is 2004 data, 2005 data not yet avaible

Female patients were responsible for 80,004 hospitalizations for ACSCs in 2005, while males were responsible for the remaining 59,752. The female and male total ACSC hospitalizations represented 14% and 14.7% of the respective total discharges for all conditions of the two gender groups. In 2004, the percentages of potentially avoidable hospitalizations of total discharges were 15% and 16.2% females and males, respectively.

Table 2. Potentially Avoidable Hospitalizations by Gender, 2004 & 2005 Comparison

	All Hospital Discharge			ACSC Discharges			% ACSC of Total		
Gender	2004	2005	% Change	2004	2005	% Change	2004	2005	Change
Female	470,556	572,874	22%	70,683	80,004	13%	15.0%	14.0%	-1.0%
Male	309,100	407,265	32%	49,986	59,752	20%	16.2%	14.7%	-1.5%
Unknown	8	47		-	9		0.0%	19.1%	19.1%
Total	779,664	980,186	26%	120,669	139,765	16%	15.5%	14.3%	-1.2%

Table 3 summarizes potentially avoidable hospitalizations by race. In, 2005, Black and White Tennesseans reported 158,901 and 767,832 inpatient hospitalizations, respectively, for all conditions. Black patients appeared to have a slightly higher rate of potentially avoidable hospitalizations than White patients (16.2% vs. 14.3%), while Hispanics and other small racial groups, such as Asians, Native Americans, and Pacific Islanders, exhibited much lower rates than either the White or Black population subgroup.

Table 3. Potentially Avoidable Hospitalizations by Race, 2004 & 2005 Comparison

	All Hospital Discharge			ACSC Discharges			% ACSC of Total		
Race	2004	2005	% Change	2004	2005	% Change	2004	2005	Change
White	604,472	767,832	27%	94,756	109,534	16%	15.7%	14.3%	1.4%
Black	116,658	158,901	36%	19,588	25,747	31%	16.8%	16.2%	0.6%
Hispanic	14,689	11,777	-20%	1,488	857	-42%	10.1%	7.3%	2.8%
Other	18,319	16,912	-8%	2,759	2,025	-27%	15.1%	12.0%	3.1%
Unknown	25,526	24,764	-3%	2,078	1,602	-23%	8.1%	6.5%	1.6%
Total	779,664	980,186	26%	120,669	139,765	16%	15.5%	14.3%	1.2%

Table 4 reports potentially avoidable hospitalizations by major payer group. There appeared to be substantial inter-group differences in the proportion of potentially avoidable hospitalizations in 2004 and 2005. Medicare led the rate of potentially avoidable hospitalizations for both years, with 22.8% and 19.6% of its inpatient discharges being potentially preventable in 2004 and 2005, respectively. However, Medicare shows the most improvement in this statistic from 2004 to 2005. Medicare and the "Other" category, which includes Workers Compensation, for example, were the only two payer groups that exceeded the state average of 14.3% in 2005.

Table 4. Potentially Avoidable Hospitalizations by Payer group, 2004 & 2005 comparison

	All Hospital Discharge			ACSC Discharges			% ACSC of Total		
Payer	2004	2005	% Change	2004	2005	% Change	2004	2005	Change
Medicare	334,949	401,379	20%	76,324	78,820	3%	22.8%	19.6%	3.2%
TennCare	168,738	172,215	2%	19,494	20,055	3%	11.5%	11.6%	-0.1%
Commercial and BC/BS	226,215	304,063	34%	19,242	26,832	39%	8.5%	8.8%	-0.3%
Uninsured/Self Pay	22,510	34,649	54%	3,012	4,538	51%	13.4%	13.1%	0.3%
Other	2,314	52,861	2184%	269	7,984	2868%	11.6%	15.1%	-3.5%
Unknown	24,939	15,019	-40%	2,328	1,536	-34%	9.3%	10.2%	-0.9%
Total	779,664	980,186	26%	120,669	139,765	16%	15.5%	14.3%	1.2%

Commercial and BlueCross BlueShield plans reported the lowest percent ACSC of total inpatient hospitalizations for both years with 8.5% and 8.8% in 2004 and 2005, respectively. The Uninsured/Self Pay category includes mostly patients who reported that they had no insurance coverage at the time of admission and, therefore, can be considered as uninsured. About 13.1% of patients in this category were ACSCs. Finally, TennCare (Tennessee's managed-care Medicaid program) shows very little change from 2004 to 2005. With 11.6%, TennCare is 2.7% below the state average of potentially avoidable hospitalizations in 2005.

Discussion. In Tennessee, potentially avoidable hospitalizations or admissions for ACSC conditions comprised 14.3% of hospitalizations for all conditions in 2005, a slight drop from the 2004 rate of 15.5%. There appeared to be a slight difference due to gender in the percentage of ACSC hospitalizations, though the gap shrunk from 2004 to 2005 by almost half. Race shows the same slight difference between Black and White population subgroups. Unlike gender, the gap between Black and White patients grew from 2004 to 2005, as the percent of ACSCs of total hospitalizations of White patients showed much more improvement than that of Black patients.

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For additional Tennessee Hospital Discharge Statistics, visit the Web site of the Methodist Le Bonheur Center for Healthcare Economics at: http://healthecon.memphis.edu/

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Cyril F. Chang is the Director of Methodist Le Bonheur Center for Healthcare Economics at the University of Memphis, Memphis, Tennessee.

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For more information about this report and other research projects, contact:
Dr. Cyril F. Chang
Professor of Economics and Director
Methodist Le Bonheur Center for Healthcare Economics
Fogelman College of Business and Economics
The University of Memphis
Memphis, Tennessee 38152
Phone: 901-678-3565
Fax: 901-678-2685
E-mail: cchang@memphis.edu
http://healthecon.memphis.edu/